



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent application

Inventor(s)

Title of invention

the specification of which is being transmitted herewith

OR

In re application of: YANG, Tsun-Neng; LAN, Shan-Ming

Application No.: 10 / 688,502 Group No.:

Filed: October 17, 2003 Examiner:

For: LIGHT-EMITTING DEVICE WITH A CURRENT BLOCKING STRUCTURE
AND METHOD FOR MAKING THE SAMEAssistant Commissioner for Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10*

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(Information Disclosure Statement [6-1]—page 1 of _____)

NOTE: "An information disclosure statement shall be considered by the Office if filed by the applicant:

- (1) Within three months of the filing date of a national application;
 - (2) Within three months of the date of entry of the national stage as set forth in § 1.491 in an international application; or
 - (3) Before the mailing date of a first Office action on the merits, whichever event occurs last."
- 37 C.F.R. § 1.97(b).

NOTE: "Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section." 37 C.F.R. § 1.56(a).

"Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) each inventor named in the application;
- (2) each attorney or agent who prepares or prosecutes the application; and
- (3) every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application." 37 C.F.R. § 1.56(c).

NOTE: The "duty as described in § 1.56 will be met so long as the information in question was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98 before issuance of the patent." Notice of January 9, 1992, 1135 O.G. 13 -25 at 17.

WARNING: "No information disclosure statement may be filed in a provisional application." 37 C.F.R. § 1.51(b).

List of Sections Forming Part of This Information Disclosure Statement

The following sections are being submitted for this Information Disclosure Statement:

(check sections forming a part of this statement: discard unused sections
and number pages consecutively)

1. ☒ Preliminary Statements
2. ☒ FORMS PTO/SB/08A and 08B (formerly FORM PTO-1449)
3. ☐ Statement as to Information Not Found in Patents or Publications
4. ☐ Identification of Prior Application in Which Listed Information Was Already Cited and for Which No Copies Are Submitted or Need Be Submitted
5. ☐ Cumulative Patents or Publications
6. ☒ Copies of Listed Information Items Accompanying This Statement
7. ☐ Concise Explanation of Non-English Language Listed Information Items
 - 7A. ☐ EPO Search Report
 - 7B. ☐ English Language Version of EPO Search Report
8. ☐ Translation(s) of Non-English Language Documents
9. ☒ Concise Explanation of English Language Listed Information Items (Optional)
10. ☒ Identification of Person(s) Making This Information Disclosure Statement

(complete the following, if appropriate)

Sections _____, respectively, have been continued on ADDED PAGE(S).

NOTE: "Once the minimum requirements are met, the examiner has an obligation to consider the information." Notice of April 20, 1992 (1138 O.G. 37-41, 37).

Section 1. Preliminary statements

Applicants submit herewith patents, publications or other information, of which they are aware that they believe may be material to the examination of this application, and in respect of which, there may be a duty to disclose.

The filing of this information disclosure statement shall not be construed as a representation that a search has been made (37 C.F.R. 1.97(g)), an admission that the information cited is, or is considered to be, material to patentability, or that no other material information exists.

The filing of this information disclosure statement shall not be construed as an admission against interest in any manner. Notice of January 9, 1992, 1135 O.G. 13-25, at 25.

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Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449A/PTO

Complete if Known

(use as many sheets as necessary)

Sheet	1	of	1
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Application Number	10/688,502
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Filing Date	October 17, 2003
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First Named Inventor	YANG, Tsun-Neng
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Group Art Unit

Examiner Name

Attorney Docket Number	1970-1
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U.S. PATENT DOCUMENTS

[illegible]

FOREIGN PATENT DOCUMENTS

[illegible]

Examiner
Signature

Date _____

Considered

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO:** Assistant Commissioner for Patents, Washington, DC 20231.

Section 6. Copies of Listed Information Items Accompanying This Statement

NOTE: 37 C.F.R. 1.98(a)(2) requires that any information disclosure statement filed under § 1.97 shall include: "A legible copy of: (i) Each U.S. and foreign patent; (ii) Each publication or that portion which caused it to be listed; and (iii) All other information or that portion which caused it to be listed, except that no copy of a U.S. patent application need be included . . . "

NOTE: The wording in § 1.98(a)(2)(iii) makes it clear that the requirement to submit a copy of each item of information listed in an information disclosure statement does not apply to the citation of a U.S. patent application. Notice of January 9, 1992, 1135 O.G. 13-25, at 14.

Legible copies of all items listed in Forms PTO/SB/08A and 08B (formerly Form PTO-1449) accompany this information statement.

(complete the following, if applicable)

- ☐ Exception(s) to above:
 - ☐ Items in prior application, from which an earlier filing date is claimed for this application, as identified in Section 4.
 - ☐ Cumulative patents or publications identified in Section 5.



Section 9. Concise Explanation of English Language Listed Information Items (OPTIONAL)

NOTE: *"Applicants may, if they wish, provide a concise explanation of why English-language information is being submitted and how it is understood to be relevant. Concise explanations are helpful to the Office, particularly where documents are lengthy and complex and applicant is aware of a section that is highly relevant to patentability or where a large number of documents are submitted and applicant is aware that one or more are highly relevant to patentability." Notice of April 20, 1992 (1138 O.G. 37-41, 38).*

U.S. Patent Publication No. 2003/0039288, published on February 27, 2003 to Kimura, teaches a semiconductor laser device including a lower cladding layer stacked on a compound semiconductor substrate, an active layer stacked on the lower cladding layer, an upper first cladding layer stacked on the active layer, a ridge-shaped upper second cladding layer provided on the upper first cladding layer, current blocking layers provided on both sides of the upper second cladding layer, and a contact layer provided on the upper second cladding layer.

U.S. Patent Publication No. 2001/0050530, which issued as U.S. Patent No. 6,621,106 on September 16, 2003 to Murakami et al., describes a light emitting diode (LED) of a double hetero-junction type that has a light-emitting layer of a GaAlInP material, a p-type cladding layer and an n-type cladding layer sandwiching the light-emitting layer therebetween, a p-side electrode formed on the p-type cladding layer side, and an n-side electrode formed on the n-type cladding layer side. The p-type cladding layer consists of a first p-type cladding layer positioned closer to the light-emitting layer and having a lower aluminum content and a lower impurity concentration, and a second p-type cladding layer positioned less closer to the light-emitting layer and having a higher aluminum content and a higher impurity concentration.

U.S. Patent No. 6,522,676, issued on February 18, 2003 to Goto et al., discloses A nitride semiconductor device of the self-pulsation type comprises as superposed on a substrate an n-type cladding layer, active layer and p-type cladding layer including an upwardly projecting stripe portion, an n-type current blocking layer being formed at each of opposite sides of the stripe portion. The stripe portion of the p-type cladding layer comprises an upper stripe portion and a lower stripe portion. This construction realizes a higher yield than in the prior art.

European Patent No. 1,225,670, published on July 24, 2002 to Ipswich, presents a semiconductor device with one or more current confinement regions and a method of manufacturing such a device, particularly buried heterostructure light emitting devices such as semiconductor lasers and light emitting diodes. The device comprises an active layer, a current conduction region, one or more current confinement regions adjacent the current conduction region.

U.S. Patent No. 6,420,732, issued on July 16, 2002 to Kung et al., teaches structures for light emitting diodes, which include improved current blocking and light extraction structures.

The diodes typically include a substrate formed on a first electrode, a first confining layer of a first conductivity type formed on the substrate, an active region formed on the first confining layer, a second confining layer of a second conductivity type formed on the active region, and a window layer of the second conductivity type formed on the second confining layer. A contact layer of the second conductivity type is formed on the window layer for making ohmic contact, a conductive oxide layer is formed on the contact layer, and a second electrode is formed on the conductive oxide layer.

U.S. Patent No. 5,949,093, issued on September 7, 1999 to Tamamura, describes semiconductor light emitting device that comprises: a plurality of II-VI compound semiconductor layers stacked on a semiconductor substrate; a contact layer formed on the II-VI compound semiconductor layers; a first first-conduction-type-side electrode and a second first-conduction-type-side electrode formed on the contact layer; and a second-conduction-type-side electrode formed on a bottom surface of the semiconductor substrate, at least a portion of the contact layer underlying the second first-conduction-type-side electrode being changed to a high-resistance region by application of an electric field between the second first-conduction-type-side electrode and the second-conduction-type-side electrode, and the high-resistance region behaving as a current blocking region.

U.S. Patent No. 5,717,226, issued on February 10, 1998 to Lee et al., discloses a surface-emitting AlGaInP LED. The AlGaInP LED comprises: a buffer layer, a first type of AlGaInP cladding layer, a AlGaInP active layer, a second type of AlGaInP cladding layer, and a second type of contact layer on a first type of GaAs substrate, a conductive transparent electrode, a first photoresist layer with a hole is formed on the middle above the transparent electrode. The process further includes forming a metal layer on the hole being etched to form a Schottky barrier.

U.S. Patent No. 5,153,889, issued on October 6, 1992 to Sugawara et al., presents a semiconductor light emitting device, comprising a semiconductor substrate, a double hetero structure portion formed on the front surface of the substrate and consisting of an InGaAlP active layer and lower and upper clad layers having the active layer sandwiched therebetween, a first electrode formed in a part of the surface of the double hetero structure portion, and a second electrode formed on the back surface of the substrate.

Section 10. Identification of Person(s) Making This Information Disclosure Statement

The person making this statement is

(check each applicable item)

- (a) ☐ the inventor(s) who signs below

SIGNATURE OF INVENTOR

(type name of inventor who is signing)

- (b) ☐ an individual associated with the filing and prosecution of this application (37 C.F.R. § 1.56(c))

SIGNATURE OF INVENTOR

(type name of inventor who is signing)

- (c) ☒ the practitioner who signs below on the basis of the information:

(check each applicable item)

- ☐ supplied by the inventor(s).
☐ supplied by an individual associated with the filing and prosecution of this application. (37 C.F.R. § 1.56(c))
☒ in the practitioner's file.

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SIGNATURE OF PRACTITIONER

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